Contribution ID: **230** Type: **Oral presentation**

The utilization of the event-recorded data acquisition with the sample environments in MLF at J-PARC

J-PARC MLF, which has the spallation neutron source, has adopted the event recording method as the standard data acquisition (DAQ) mode. This method has realized that all signals which are detections of neutrons at detectors installed in the instruments are recorded as events with a timestamp.
A typical event recorded data produced from DAQ system at MLF consists of 2 types of events. One is the detected neutron events including the detection position with the time-of-flight information, which is used to distinguish the energy, another is the kicker events of the neutron spallation with an actual time. By using these 2 types of timestamps, it is easy not only to do the variety unit conversion of measured data with the flexible binning but also to slice data in the time region required to be analyzed and visualized.
This useful feature is utilized on various measurement methods, for example, the multi-Ei method used in the inelastic scattering measurement.
In order to obtain the conditions of the sample environments devices and the instrument optical components like a beam narrower and chopper, MLF had developed and utilized the other DAQ board, named TrigNET, to input a common electric signal.
The event produced by this TrigNET consists of the electric signal status and the timestamp which has same type of timestamps as neutron detection event. By treating neutron events and signal status events on same timeline, it is possible to extract only those data that satisfy a required device conditions as a filtering function. This 'event filtering' method can achieve the observation of the transient phenomena produced by the external field applying to the sample with higher time resolution. For example, if the sample environment equipment can be arranged so that the electric field, magnetic field, and temperature applied to the sample can be extracted in the form of electrical signals, it will be possible to extract only the neutron scattering data under the external field conditions that need to be observed.
This method has already been generalized in some instruments in MLF and is being utilized in actual experiments. Especially, this method is useful for the stroboscopic measurement, which improves statistical accuracy by repeatedly measuring the response inside the sample to external field change in a short term, for example the periodic electric field, the rapid heating and cooling, applying the ultraviolet light and so on.

Primary author: INAMURA, Yasuhiro (Japan Atomic Energy Agency)

Presenter: INAMURA, Yasuhiro (Japan Atomic Energy Agency)